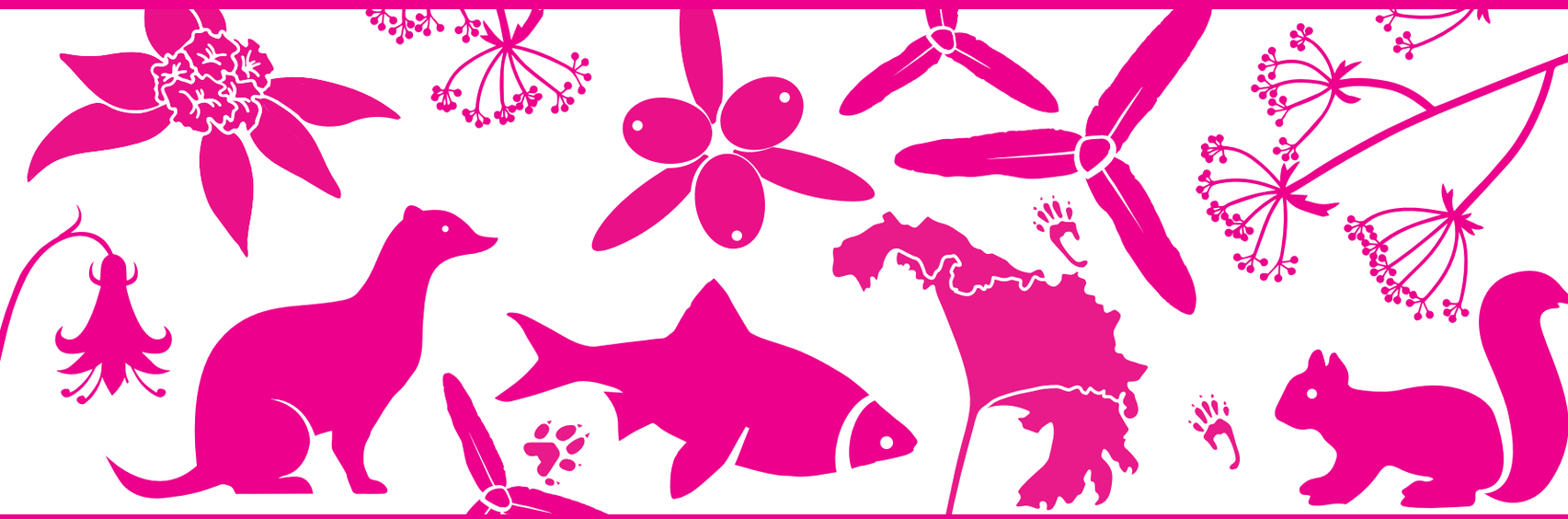
Dublin City Invasive Alien Species Action Plan 2016-2020



Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council


Biodiversity

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Executive Summary

Many IAS (Invasive Alien Species) are now well established in Ireland. The speed and fluidity of their invasion and spread presents major difficulties for traditional forms of environmental management. A coordinated approach between a variety of public bodies and organisations is necessary to achieve targets. Some suggestions are given as to how this can be achieved. The fact that Dublin Bay recently achieved UNESCO Biosphere status makes it all the more imperative that IAS are given high priority as they are a real and increasing threat to our biodiversity.

The European Union has passed new IAS Regulations in 2014 which has clarified our requirements in dealing with these species. This legislation will be further enacted in 2016. This Plan examines its implications for Dublin City Council (DCC) and covers the first reporting period under the Regulations. It will assist in Ireland meeting its obligation to prepare a national assessment report by June 2019 and review on the EU Biodiversity Strategy implementation to 2020.

Ireland already has national legal obligations both to preserve our biodiversity and to ensure no further spread of the highest risk species. A heightened awareness now exists of the threats posed by IAS and they are becoming the focus of increasing media attention. This Action Plan aims to put in place a management programme for the highest risk IAS, as identified in the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations (2011), which are known to be present in Dublin.

IAS are a significant and increasing cost to our economy. Pathways of invasion frequently occur along waterways and proceed downstream, so Dublin City is in an especially vulnerable location. The status of each species present in the city is examined and assessed and appropriate eradication/control measures are advised. Complete eradication of certain species may be possible, in other cases control and prevention of any further spread are more realistic targets.

Strategies for control of IAS have been in place in Dublin City to deal with certain species since 2007 under the first Dublin City Biodiversity Action Plan (2008-2012), and they have achieved a certain amount of success. In some cases, management strategies can build upon what is already in place, in others a new start and new ways of thinking will be necessary. Monitoring of control work is a vital part of the plan. It will help to assess the success or otherwise of the work. There are no quick fix solutions to this problem. A long term strategy is recommended to deal with almost all of these species. Targets are set out and control efforts should be maintained until these are achieved.

Examples are given of projects, which have been undertaken by DCC. These are not just issues for local authorities to deal with. An aspect of these projects, which will be looked at and is felt to be very important, is that of public involvement and ownership of the issue. DCC is aiming to increase general awareness of IAS and what people can do to help tackle them. A significant amount of information has been distributed through various channels and community and volunteer groups have been brought on board on certain projects.

The importance of implementing biosecurity measures is stressed. If these can be publicised and adopted, they will prevent further spread of IAS in Dublin City because anthropogenic activities constitute the main pathways[1] through which these species spread.

The ways and means are there to tackle IAS in Dublin City. The success of these efforts will depend primarily on:

- The recognition of the extent of the IAS issue and the need to manage it.
- The establishment of an efficient system of recording and mapping.
- The degree of co-operation and co-ordination between the relevant public authorities.
- The commitment to consistent and persistent efforts to tackle high risk species.
- The generation of positive publicity and public involvement where possible.
- The implementation of biosecurity measures by local authorities, private companies, recreation/community groups and the public

The impacts of IAS in terms of degradation of our environment and damage to economic interests necessitate that we recognise IAS management as a key issue for sustainable development of Dublin. Failure to address the issue will limit the potential for future generations of Dubliners to realise benefits and affect their quality of life. This Plan is a first step toward safeguarding our interests and ensuring opportunities for sustainable growth of the City.

Section 1: **Introduction**

There are 17 species of IAS recorded at present in Dublin City.

1.1 Background

The Convention on Biological Diversity (CBD) states that "Alien species that become invasive are considered to be the main direct drivers of biodiversity loss across the globe".[2] The impacts of IAS are wide ranging and destructive from economic, social, health and ecological viewpoints. The annual costs of impacts and control efforts equal five percent of the world's economy.[3] The impacts have become so serious that legal obligations are in place in all EU states, to control IAS.

Humans have spread wildlife around the world, outside their native ecosystems. Most introduced species don't cause major harm and simply become part of the flora and fauna. In contrast, IAS are species whose introduction and/or spread outside their natural past or present distribution threatens biological diversity.[4] An IAS could be a micro-organism, fungi, plant or animal. IAS have certain characteristics that help them to succeed: they reproduce and grow rapidly, they have a high ability to disperse, they can adapt themselves to a wide range of new conditions and environments, and can survive on various food types.[5]

In their native ecosystems these species are kept in check by predators, diseases and competitors that have evolved along with them. In areas to which they are introduced these checks are generally absent. IAS can become rampant in their introduced environment, causing many harmful effects to native biodiversity and human activities.

Islands are especially vulnerable to IAS because of a lack of strong competitors and predators. Because of our island situation, we have a relatively low diversity of species which have evolved over thousands of years in comparative isolation. Introduced species can upset this delicate balance.

The enjoyment and recreation people in the city get from our biodiversity is immeasurable. The UNESCO Biosphere designation has now been extended to the whole of Dublin Bay. There are many other examples of protected habitats and species in Dublin City. The importance of acting against IAS is clear in this context.

1.2 Costs and Solutions

It is estimated that IAS currently cost the economies of Republic of Ireland and Northern Ireland a combined total of €202,894,406 per year.[6] Prevention is better than cure and the sooner existing threats are tackled and the danger of potential threats is recognised and action taken, the less the cost that will ultimately have to be borne. They pose a serious threat to the city's economy, biodiversity and recreation potential. Inland Fisheries Ireland (IFI) considers them the greatest threat to our inland fisheries. The opportunity exists for Dublin to take the lead nationally and set an example for how to deal with IAS.

Until recently, various factors have impeded public authorities adopting a real programme to tackle IAS. The lack of clear legislation enabled the issue to be avoided. Staff shortages, lack of finance, co-ordination difficulties and fragmentation of land ownership, all contributed to a lack of action and enforcement nationally.

Control measures have begun but need to be applied consistently and rigorously, with clear communication and coordination between the relevant authorities. With legal obligations now in place and penalties for non-compliance, there is greater urgency to tackle the problem.

Trans-boundary co-operation between local authorities is a vital part of the process. Co-operation between local authorities and other organisations involved in land or water management is also crucial. The approach to tackling IAS needs to be well planned and co-ordinated and when successful methodologies are developed these can be used on a wide scale and on a repeat basis. It is important that protocols for dealing with IAS are known and used by Councils during planning and development works and are adhered to by contractors. The strategies and targets vary between species but the EU Regulations of 2011 and 2014 specify as to how actions should proceed.

It is important that local authorities and relevant organisations are seen to be taking action. This will inform the public of the seriousness of the situation and help create an awareness of the issue. It also may encourage private citizens to carry out control works on their lands. The nature of IAS requires consistent and comprehensive strategies.

Section 2: **Legal Context**

The control of IAS is governed by both European and Irish Regulations. Additional protection for sensitive habitats is provided by the EU Habitats Directive.

2.1 Irish Regulations

The Irish Regulations[7] European Communities (Birds and Natural Habitats) Regulations (S.I. No. 477 of 2011) establish the principle of prevention and also provide for penalties for those found in breach. The key aspects of the Regulations for Dublin City are:

- They strengthen and clarify the obligations of public authorities to protect designated sites of European importance for nature conservation. These are Special Protection Areas (SPA) and Special Areas of Conservation (SAC) designated under the EU Birds and Habitats Directives.
- They complement the Irish Planning and Development Act of 2010. Local authorities now have legal responsibilities and powers under this Act to ensure that the requirements of the above Directives are adhered to in development plans and development consents.
- All other statutory authorities must adhere to them in their planning consent and operational functions. Furthermore, all public authorities are now obligated to ensure compliance with the EU Birds and Habitats Directives and to uphold and enforce the requirements of the Regulations.
- They give powers to the Minister to identify activities requiring his/her consent. These are activities likely to harm an SAC or SPA or their habitats or species. An important point to note is that this includes activities outside a protected area but that could have an impact on that protected area.
- They make specific provisions for IAS under Regulation 49 which is concerned with the prohibition on the introduction and dispersal of certain species and Regulation 50 which is concerned with the dealing in and keeping of certain species. It is now illegal to release non-native animals into the wild. Any person, who plants, causes or allows the dispersal, or causes the spread and growth of a listed plant, is guilty of an offence.
- They provide for inspection of property to ensure compliance. It is an offence to distribute or spread a vector material. A vector material is a biological pathway through which an IAS may spread and may include soil or seed.

2.2 European Union IAS Regulations

The EU IAS Regulations[8] sets down a comprehensive list of regulations that member states must comply with. The main points include:

- The establishment of a list of IAS of Union concern, against which member states need to take action. Member states have provision to establish their own lists.
- Risk assessments must be carried out on IAS, to include pathways of introduction and spread.
- A list of restrictions to be complied with.
- Provisions for member states to take emergency measures in the presence of or risk of introduction of an IAS to their territory.
- Member states must establish and implement Action Plans to address priority pathways for the introduction and spread of IAS.
- Surveillance and monitoring systems must be established.
- By January 2016 structures will be in place for member states to carry out official controls at their borders to prevent introduction of IAS.
- The EU Commission must be notified of the detection of a new IAS or re-establishment of an eradicated one. Eradication measures must then take place.
- A range of management measures are to be brought into place to deal with IAS, to include restoration of damaged ecosystems.
- The "polluter pays principle" will be applied to recover costs. Member states can take all necessary measures to ensure penalties are applied.
- Member states have provision to adopt more stringent rules if deemed necessary.
- By June 1st 2019 member states must submit a report to the Commission detailing their actions in compliance with these Regulations.

2.3 European Union Directives

The protection of ecosystems from IAS is included in several EU Directives.

IAS can spread through and impact heavily upon waterways. The EU Water Framework Directive (2000/60/EC), which came into law in Ireland in 2003, requires that member states, "maintain the status of waters that are already of high or good quality, prevent any further deterioration in water quality and ensure that all waters achieve at least good status by 2015." Controlling IAS is included in the Programme of Measures for Dublin City for ensuring good ecological status of waterbodies. This Directive provides for the management of water resources on a catchment basis within River Basin Districts, which ties in practically with how IAS need to be managed. Local authorities are obliged to work together on a catchment basis and may be liable if they allow IAS to spread to other administrative areas. The recent Regulations add certainty and clarity as to how we can achieve the requirements of the Water Framework Directive. Requirements by Dublin City Council for assessment of impacts of any projects or plans on European nature conservation sites are set out in the EU Habitats Directive (92/34/EEC) in Article 6.3. This includes the designated SAC and SPA sites referred to above.

The Environmental Impact Directive (85/337/EEC) requires assessment of impacts of certain projects on all flora, fauna, soils, landscapes and human beings. This can include how projects may result in spread of IAS and cause impacts to biodiversity and humans. The Environmental Liabilities Directive (2004/35/EEC) requires the prevention and remedying of environmental damage in terms of impacts on ecology. The Directive defines "environmental damage" as damage to protected species and natural habitats, damage to water and damage to soil.

Section 3: **Background on IAS in Dublin City**

A scenic view of Dublin Bay with sea buckthorn in foreground at Irishtown Nature Park.

3.1 Historic

The historic extent of many of the IAS currently resident in Dublin City is difficult to determine as recording was patchy until recent years. The concept of an "Invasive Alien Species" is quite recent, as is an appreciation of the damage they can cause. The NBDC currently hold the most comprehensive records, combining public records with survey data, but the majority of these date from 2009 onwards. The first major survey focused on IAS in the city occurred in 2009.[9]

Invasive species have been brought into Ireland for different reasons; economic, ornamental, recreational. Some, such as Giant Hogweed *(Heracleum mantegazzianum*), Himalayan Balsam *(Impatiens glandulifera)* and Japanese Knotweed *(Fallopia japonica)*, were brought into the country as ornamental plants in the 19th century. They subsequently escaped, survived and spread, becoming invasive. Mink *(Neovison vison)* were farmed for their fur and either escaped or were released.

The Grey squirrel *(Sciurus carolinensis)* is a great example of what an IAS can do in a short space of time. It was introduced to Ireland just once, in 1911 in Longford, but since then has spread to most of the country and is widespread throughout the city. It has now ousted the native Red squirrel *(Sciurus vulgaris)* from almost all of its Dublin City habitats.

Aquatic IAS are most likely to have come in on boating or angling equipment from elsewhere in the country or from overseas, to have escaped from garden ponds or to have been dumped as waste. Biosecurity measures are especially important in dealing with aquatic species. Other species such as Sea Buckthorn *(Hippophae rhamnoides)* and Common Cordgrass *(Spartina anglica)* were imported in the 20th century to stabilise sand dunes and to reclaim wetlands respectively.

Although the native red squirrel was at St. Anne's Park long before the Guinness family built their home and walled gardens, it was ousted by the grey squirrel, seen here in front of the clock tower (Photo: Anthony Woods).

3.2 Factors of Invasion in Dublin

The fragmentation of land and water ownership in Dublin City between various public bodies and private individuals and the variation in the landscape, from built environment, to public parks, to private houses and gardens, to waterways, creates difficulty in managing IAS. The levels of co-ordination and planning needed are likely to be higher and more detailed than anywhere else in the country. The city is a transport hub with a major port and airport. It caters for millions of tourists each year and is the focal point of national transport routes. With the economy picking up, there will be more construction projects that could spread IAS vector materials such as seeds, soil and root fragments.

Many of the IAS in Dublin City occur on or near and spread via waterways; The Dodder, Liffey and Tolka plus numerous smaller rivers as well as the Grand and Royal Canals, all of which empty into Dublin Bay. The importance of waterways in the spread of aquatic species such as Curly leaved waterweed *(Lagarosiphon major)* and Nuttall's waterweed *(Elodea nuttallii)* is obvious. However the three major terrestrial plant IAS: Giant Hogweed, Himalayan Balsam and Japanese Knotweed are often located close to and spread by water, as does the American Mink *(Neovison vison)*.

The DCC administrative area, by virtue of its downstream location is prone to infestation from neighbouring districts. It is also prone to re-infestation because unless IAS are tackled on a catchment wide basis they will simply re-colonise areas from which they have been removed. There are four local authorities in the Dublin region with different authorities managing sections of waterways and in some cases opposite banks. This again highlights the importance of co-operation.

The fragmentation of land ownership leads to access difficulties, which impedes location, monitoring and removal of IAS. As regards private landowners, education and awareness are important. It is vital that the Regulations are applied and enforced on the many development projects that will take place in the coming years. Dublin City has an abundance of biodiversity and is heavily designated for this. The city has several protected species listed in the EU Annex's which may be directly affected by IAS. These include the Otter *(Lutra lutra)*, Kingfisher *(Alcedo atthis)* and Atlantic salmon *(Salmo salar)*.

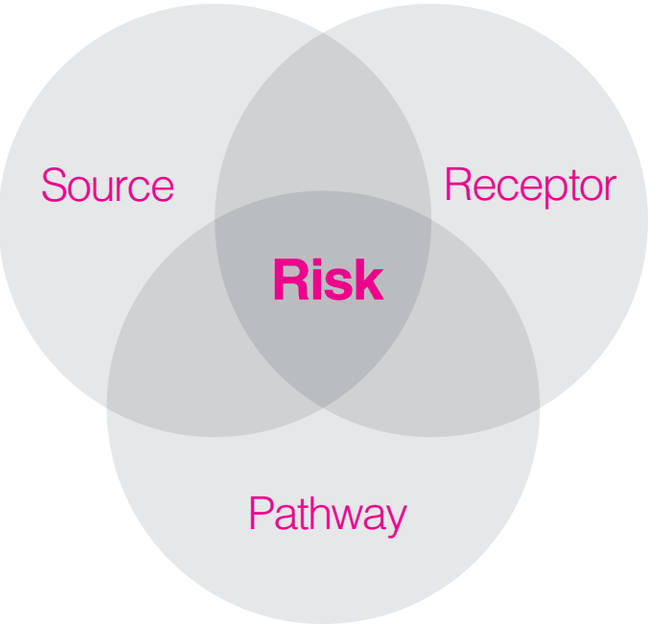
The seeds of Giant Hogweed (Heracleum mantegazzianum) can disperse by water and wind down an entire river catchment, making it difficult to control without the cooperation of all landowners (Photo: Fritz Geller-Grimm).

Section 4: **Source-Path-Receptor**

IAS have sources from which they originate, pathways along which they travel and receptive environments in which they become established. A vector material is a biological pathway through which an IAS may spread. There are human pathways as well and the two are often inter-linked. To give an example the source population of Himalayan Balsam exists in the Western Himalayas. It was brought (by seed or plant vector) via a human pathway into gardens in Ireland. This established a new source population. From there it escaped, (by seed vector spread by wind, water, animals, humans), into the wild, where a receptive environment existed. It established itself there and so the cycle of spread continues.

A risk-based approach to monitoring IAS evaluates the relationships between the IAS sources, the organisms that live in the environment that receives the IAS, and the pathways that link the source to the organisms to determine the potential for exposure. Risk (or exposure) can only exist if a source, pathway, and receptor coincide (see Figure below). In this risk-based approach, the receiving environment is viewed as an ecosystem and the invasive alien species is considered in relationship to that ecosystem. This means that the native organisms, their habitat and ecosystem, and the nature of how they are exposed to the invasive alien species all need to be considered.

Managing the risk of IAS through a source-pathway-receptor model is best practice.



Section 5: **Codes of Practice in Ireland**

The River Liffey is home to many rowing clubs and a location for racing competitions and so biosecurity is essential to protect it from invasive alien species (Photo: Anthony Woods).

5.1 Biosecurity

Biosecurity includes all policies and measures that a country implements to minimise the harmful effects of invasive alien species, ranging from preventing the entry of unwanted species into an area to their management if they do enter. Biosecurity is a broader concept than quarantine. As the capital city, Dublin has an important national role in ensuring biosecurity from invasive alien species. Codes of Practice for IAS in Dublin City are included in Appendix 1. Biosecurity Codes of Practice have also been developed by Invasive Species Ireland and Inland Fisheries Ireland, covering such areas as horticulture, aquaculture, water users and marinas. These Codes give advice and guidance on the right methods to prevent the spread of IAS. They are a good way to get the message across in a simple and practical way and encourage people to consider their environment. Adherence to Biosecurity Codes of Practice by public authorities, recreation groups, volunteers and the public is critical to tackling IAS. They are currently voluntary but they do increase awareness of the issue and can adapt and change to respond to threats as they arise.

These Codes have particular importance for aquatic invasive plants. These can become a health hazard when they grow in waterways where recreational activities such as swimming, boating or rowing take place. The River Liffey is home to several rowing clubs and is used for competitive sports which attract boats from other regions. Therefore, it is particularly vulnerable to invasive alien species being brought in accidentally by boat surfaces or water in boats. Recent invasions on the Shannon navigation system by the Asian clam show the impact of just one boat causing the shutdown of an entire section of a waterway to all users.

It is required that a system of inspection of plants delivered to DCC for parks and for work schemes is put in place. Plants, soil, containers and other associated materials can act as vectors for the spread of invasive species.

As the capital city, Dublin has an important national role in ensuring biosecurity from invasive alien species.

Section 6: **Assessment of Risk Status in Dublin City by Species**

There are seventeen legally-designated species of IAS currently known to be present in Dublin City. Each species is risk-assessed below. Table 1 shows the categorisation of risk for these species.

Table 1: Risk Assessment Criteria

H **High Risk**	Species with high ability to spread. Currently causing most damage in Dublin City to native biodiversity, recreation, the economy and or constitute a public health risk. Control urgently required.
M **Medium Risk**	Highly invasive elsewhere. Present in Dublin City but limited spread and/or not currently causing the same problems as high risk species. Need to be monitored. Control necessary.
L **Low Risk**	Limited spread and considered to be under control. Do not constitute a threat to native biodiversity, recreation, the economy or public health. Control as legally required.
U **Unknown Risk**	Current spread and nature of impacts in Dublin City not known.

Table 2 shows provides the list of the designated species of flora and fauna which pose the highest risk in Dublin City currently to place particular emphasis on the need to monitor their impacts and ensure controls.

Table 2: Invasive Alien Species of highest risk in Dublin City

Species: Flora	 **High Risk**
Elodea nuttallii {Nuttall's waterweed}	Threat to public safety along waterways such as the Liffey due to entanglement of boats and reduced passage width.
Fallopia japonica {Japanese knotweed}	Threat to built structures including houses. Legal consequences to its spread. Exceptional ability to spread and very difficult to eradicate once established, altering habitats.
Heracleum mantegazzianum {Giant Hogweed}	Spreads rapidly along waterways and is a public health risk, especially to children; rapidly out-competes native plants. Presents latent long-term risk due to lengthy seed viability.
Hippophae rhamnoides {Sea buckthorn}	Threatening the status of protected habitats at North Bull Island National Nature Reserve and Irishtown Nature Reserve as alters groundwater hydrology and out-competes protected flora.
Impatiens glandulifera {Himalayan Balsam}	Spreading rapidly along waterways; alters native habitat leading to increased river bank erosion and decreased water quality due to sediment loading
Species: Fauna	
Neovison vison {American mink}	Threatens wide range of protected species and native biodiversity along our waterways and alters breeding sites.

Table 3 provides an analysis of the current risk to Dublin City Council of all invasive alien species designated under Irish law. This is based on data available and may be updated during the timeframe of this plan. For species where there is not enough data currently available to determine the risk posed, it is intended that further survey will be carried out.

Table 3: Current Risk Status of IAS in Dublin City as designated in the EUROPEAN COMMUNITIES (BIRDS AND NATURAL HABITATS) REGULATIONS 2011 S.I. No. 477 of 2011

Species: Flora	H High Risk	M Medium Risk	L Low Risk	U Unknown Risk
Azolla filiculoides {Water fern}			L	
Crassula helmsii {New Zealand pigmyweed}		M		
Elodea canadensis {Canadian waterweed}			L	
Elodea nuttallii {Nuttall's waterweed}	H			
Fallopia japonica {Japanese knotweed}	H			
Gunnera tinctoria {Giant rhubarb}		M		
Heracleum mantegazzianum {Giant hogweed}	H			
Hippophae rhamnoides {Sea buckthorn}	H			
Hyacinthoides hispanica {Spanish bluebell} and **Hyacinthoides non-scripta × Hyacinthoides hispanica** {hybrid}				U
Impatiens glandulifera {Himalayan balsam}	H			
Lagarosiphon major {Curly leaved waterweed}		M		
Myriophyllum aquaticum {Parrot's feather}		M		
Rhododendron ponticum {Rhododendron}		M		
Spartina anglica {Common cordgrass}		M		
Species: Fauna				
Neovison vison {American mink}	H			
Rutilus rutilus {Roach}				U
Sciurus carolinensis {Grey squirrel}		M		

Section 7: **Targets and Actions**

7.1 Targets:

- Protect our native species and habitats and ensure that IAS do not jeopardise the protected status of any of these habitats or species.
- Comply with national and EU legislation, including recent European Union Regulations, which deal specifically with IAS.
- Continue and increase co-operation between public authorities charged with protecting Dublin's biodiversity.
- Reduce the long term economic cost of IAS to Dublin City.
- Improve the amenity and recreation value of Dublin City for its residents and tourists.
- Protect Dublin City's public spaces and the health of its citizens.
- Promote awareness of the issues to as wide an audience as possible.

7.2 Actions:

- Continue partnerships of public bodies working on IAS control policy on river catchments.
- Continue current projects, e.g. mink control on the Dodder and Sea Buckthorn control at North Bull Island. Consider scope for student involvement.
- Identify the priority areas in which IAS are to be controlled.
- Take swift action against species that pose a serious health risk, especially aquatic IAS.
- Biosecurity Codes of Practice to be used by Council staff, private companies, sports/recreation groups and the public.
- Ensure compliance with legislation in development works undertaken by DCC.
- Develop work plans for individual species identifying who can perform work in specific areas (Council staff, contractors, volunteers/community groups).
- Continue publicity at events/displays/talks.
- Develop remediation measures for native biodiversity if necessary.
- Keep informed about Invasive Species control programmes from Ireland and throughout Europe.
- Monitor for presence of other Third Schedule Non-native species.

Targets are focused on two main objectives

1. Control and reduce the spread of existing IAS. Eradication of some species from certain defined areas should be possible. Citywide the aim should be one of control by implementing strategies for priority species.

2. Prevent any new IAS from establishing in the city.

Section 8: **Strategies for IAS in Dublin City**

Since 2007, a management regime has been progressed by DCC Parks and Landscape Services on all lands along the main river corridors owned and managed by DCC as well as a number of projects, which are detailed below. The types of control methods to be used for the various IAS will be based on the experience that DCC have had in tackling these species, advice from organisations and individuals involved in similar control efforts and scientific evidence. Methodologies will be developed, which will be adapted as experience is gained in the field on what is successful in local environments.

DCC Parks and Landscape Services maintains records and these are shared with the NBDC for of all the known Third Schedule IAS and their locations in Dublin City. Key aspects of DCC's IAS strategy are to involve community groups and members of the public in our efforts, to disseminate and receive information regarding IAS and to generate positive publicity for our work. The policy at these events is to distribute information packs about IAS and encourage people to become involved where possible in control and recording efforts. Any voluntary work is very welcome and through our presence at events we hope to raise awareness of the threats.

DCC are currently involved with many community groups and they will be vital to the success of our efforts. Displays of information on IAS will be set up both in DCC premises and elsewhere and information packs made available. DCC are also involved with schools in biodiversity work and this is another avenue to publicise IAS.

DCC are involved very closely with professional conservation organisations in the city. There may be scope for the involvement of third level institutions in certain projects. Students could help with research, survey and monitoring work and gain great experience in return.

It is essential that a co-ordinated strategy is developed between the various county Councils and the Office of Public Works for invasive species control. Most of these species cannot be effectively controlled within a single Council area. Many of the larger parks in Dublin City are owned by the Office of Public Works and border on the River Liffey. They need to be managed on a river catchment basis in accordance with catchment management programmes by the EPA. The same methodology and duration of work needs to be followed within the different jurisdictions. It is vital to find the source populations of these species and work from there. Strategies for species are detailed in Appendix 3.

Recommendation: Those involved in invasive species control within the four Dublin Councils should be in regular contact about monitoring and control work for the various species. Contact may need to be established with Council further afield.

Section 9: **IAS Initiatives in Dublin City**

Our protected native waterbirds, (like the Common Swan pictured here) breed in the parks along the River Dodder such as Bushy Park, and are endangered by American mink, which can kill young birds for sport (Photo: Anthony Woods).

9.1 River Dodder

The objective on the Dodder is to bring about sustained enhancement of the catchment by improving habitat for protected native species. This will be done by carrying out actions aimed at improving the quality of the riverbed and riparian (riverbank and its vegetation) zone by control and monitoring of invasive species namely the American Mink, Himalayan Balsam and Japanese Knotweed. DCC have organised community groups, volunteers and local companies to assist in these efforts. Sightings of American Mink in the DCC section of the River Dodder in 2013-2014 coincided with a noticeable decline in breeding waterbirds at several parks along the River. DCC initiated a working group to combat invasion by mink in cooperation with South Dublin and Dun Laoghaire-Rathdown County Councils, National Parks and Wildlife Service and Inland Fisheries Ireland. DCC also worked with Birdwatch Ireland to establish a citizen science project to monitor bird populations along the rivers of Dublin and commissioned Birdwatch to carry out surveys of bird populations along the River Dodder. Through raising awareness, additional controls and parks management protocols since then, mink has declined and it is hoped that native species such as the pine marten and otter will return to the Dodder and increase over time.

Guided river walks are organised with the involvement of Birdwatch Ireland to talk about the birds of the river. Information is also given about IAS threats along the river. Coordination with Inland Fisheries Ireland, local anglers and recreational users has resulted in various events to control IAS but work is needed on an ongoing basis.

9.2 Rose Festival 2015 St Anne's Park

DCC operates a stall at this festival providing information and advice on IAS. This includes information boards, leaflets, materials and exhibits as part of the overall biodiversity programme at the festival.

9.3 North Bull Island National Nature Reserve management

It is necessary to monitor the spread of Sea Buckthorn into the three EU-protected Annex I habitats of White Dunes, Grey Dunes and Humid Dune Slacks. Sea buckthorn extent throughout the island is mapped to give a baseline figure for its distribution and monitor change. Control efforts have been taking place for over a decade. Since 2012, DCC have involved volunteers in cutting and clearing work as part of a "Recovery through Nature" project. To combat Sea Buckthorn spread DCC organise berry picking events during the autumn. A local restaurant was involved to show how the edible berries could be prepared and the event was further publicised by the *Irish Times*. The practical conservation benefits and positive publicity generated have made this project very worthwhile.

Harvesting fruit of sea buckthorn to prevent further spread at North Bull Island (Photo: Niamh Ni Cholmain).

Control of common cordgrass has been suspended following scientific evaluation that the plant is not an active threat to the salt marsh habitat. This will be monitored in accordance with the Conservation Management Objectives (NPWS 2013) for the site.

9.4 River Liffey

The spread of IAS along the Liffey requires further attention. DCC Parks and Landscape Services has been working with Inland Fisheries Ireland to assess populations of Nuttall's waterweed, due to its impacts on the recreational use of the river. Of great importance to the success of these efforts is the adoption of Biosecurity Codes of Practice by river users to avoid spread by boats. Additionally, control of Japanese knotweed is ongoing and requires further survey and monitoring. The Liffey flows directly into protected habitats designated under Natura 2000 by the European Union and therefore control of IAS on the Liffey is essential. Awareness-raising events could be further developed. The use of planning conditions for any new developments has been a useful tool to address these problems. Information about biodiversity on the Liffey is included in the schools programme at the DCC Municipal Rowing Club to raise awareness of children enjoying a day out on the river.

9.5 World Wetlands Day

As part of celebrating RAMSAR World Wetlands Day in 2015 DCC set up an information display in our civic offices, open to the public. This included information on IAS which affect protected wetland habitats.

9.6 Pets in the City

DCC has worked with Inland Fisheries Ireland at this event in 2014 to begin to raise awareness and to discourage citizens from releasing aquatic plants from aquaria and unwanted pets into the wild. This is a major source of new invasions, including introduction of predators. Education is a key component of IAS control and public events such as these are an ideal means for this.

9.7 Tolka Valley Park

DCC began control programmes for Giant hogweed along the River Tolka in 2007. A novel use of weed control mats to control Giant hogweed and Himalayan balsam was pioneered and tested in the flood zone in 2011 for a five year period. The mats fully degrade after three years, allowing native riparian vegetation to re-establish. The trial was funded by the European Union LIFE programme under the Renew4GPP Project. This project and the project below were recognised by the International Union for the Conservation of Nature.[10] Chambers Ireland awarded the Best Sustainable Environment award in 2013 to Dublin City Council for Tolka Valley Park. DCC has worked in cooperation with the Dublin Angling Initiative and the Tolka Trout Anglers Association to restore habitats along the river by planting native vegetation with local schoolchildren. Tolka Trout Anglers Association received a Local Agenda 21 award to organise planting programmes for establishing vegetation corridors to provide shade for cooling the river and new habitats in sections which were a former landfill.

Local schoolchildren working with Tolka Trout Anglers' Association and Dublin Angling Initiative to plant native vegetation to prevent IAS along the River Tolka (Photo: Maryann Harris).

Preparing the pond by clearing debris prior to installation of matting (Photo: Maryann Harris).

9.8 Darndale Park Pond

The ponds were created as part of the new park in 1999 and were popular with local anglers. However, they were taken over by Curly leaved waterweed from 2009, limiting their recreation potential. A technique of suppressing the growth of this plant with biodegradable jute matting, which had been used successfully in Lough Corrib by Inland Fisheries Ireland, was applied here and it appears to have eliminated the problem and restored the pond to good condition for angling. The project was a joint effort by DCC Parks, Inland Fisheries Ireland, Dublin Angling Initiative and Sphere 17 Regional Youth Service of Priorswood. The project partners worked together to clear the invasive weed, establish and monitor the matting layer and protect the pond through education talks given by local anglers through Sphere 17 to avoid further introduced species in future. The project was profiled by the *Irish Times* as a successful example of collaboration with the community by state agencies.

Laying jute matting at the pond at Darndale Park to control Curly Waterweed (Photo: Maryann Harris).

The ponds provide habitat for breeding waterfowl such as Common Swan and Coot (Photo: Maryann Harris).

Section 10:
How to Identify and Report IAS in Dublin City

A starting point to managing the problem of IAS is to know your species and know its location. At national level, identification guides have been prepared and these are freely available on the following websites:

- www.nonnativespecies.org has comprehensive I.D. sheets on IAS
- www.biodiversityireland.ie and www.invasivespeciesireland.com contain detailed information about established IAS and potential invaders and the threats they pose
- www.fisheriesireland.ie has information about established and potential aquatic threats as well as Biosecurity Codes of Practice for river users.

There are also web-based apps available on these websites to encourage reporting IAS to the national authorities.

The national authorities are the National Biodiversity Data Centre and Inland Fisheries Ireland. Enforcement of the legislation is by the National Parks and Wildlife Service. Local authorities such as Dublin City Council do not undertake control of IAS on private lands. However, they may require controls through planning consents.

Further information is available on the Dublin City Council website at www.dublincity.ie/main-menu-services-recreation-culture-dublin-city-parks-biodiversity-dublin-city/invasive-species.

Recording forms can be obtained from the National Biodiversity Data Centre by contacting them at 051306240 or email info@biodiversityireland.ie or by completing them online at www.biodiversityireland.ie.

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Links to further information:

www.caisie.ie

www.cbd.int/

http://www.dublincity.ie/main-menu-services-recreation-culture-dublin-city-parks-biodiversity-dublin-city/invasive-species

www.duhallowlife.com.

http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm

www.fisheriesireland.ie

www.invasivespeciesireland.com

www.iucn.org

http://merseybasin.org/giant-hogweed/

www.nature.org/ourinitiatives/habitats/forests/explore/invasives-101.xml

www.nwf.org

www.nbdc.ie

www.nobanis.org

www.nonnativespecies.org

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Glossary of Terms

Annex Species: Species of wildlife protected under EU Birds and Habitats Directives

Biodiversity: The variety within and between all species of plants, animals and micro-organisms and the ecosystems within which they live and interact.

Biosecurity: The reduction of risks caused by IAS and protection of our native biodiversity.

Biosecurity Codes of Practice: Voluntary measures designed to prevent spread of invasive species and ensure compliance with legislation.

Birdwatch Ireland: Organisation focussed on the conservation of birds and biodiversity in Ireland.

CAISIE: Control of Aquatic Invasive Species in Ireland.

CBD: Convention on Biological Diversity.

DCC: Dublin City Council

DLRCC: Dun Laoghaire Rathdown County Council.

Dodder Action Group: Local Citizens group organised to clean the Dodder and protect its environment.

Dodder Flood Alleviation Works: Work taking place along the Dodder to prevent flooding events.

Dodder Greenway: Walking and cycling route being developed along the Dodder.

EU Birds Directive: DIRECTIVE 2009/147/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 30 November 2009 on the conservation of wild birds.

EU Habitats Directives Directive: Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.

FCC: Fingal County Council.

GIS: Geographic Information System.

Grey Dunes: Fixed coastal duneswith herbaceous vegetation. Habitat code 2130.

Humid Dune Slacks: Humid depressions in dune systems. Habitat code 2190.

IAS: Invasive Alien Species.

IFI: Inland Fisheries Ireland.

IUCN: International Union for the Conservation of Nature.

National Nature Reserve: Area of importance to wildlife protected under ministerial order.

National Special Amenity Area: Landscape of national importance for its aesthetic/recreational value.

NBDC: National Biodiversity Data Centre.

NHA: National Heritage Area.

NPWS: National Parks and Wildlife Service.
Ramsar Wetland: Wetland recognised and protected under the Ramsar Convention 1971.

Recovery Through Nature Programme: Clients in Coolmine Therapeutic Community work on conservation projects.

SAC: Special Area of Conservation.

SDCC: South Dublin County Council.

SPA: Special Protection Area.

THIRD SCHEDULE: Annex to the Birds and Habitats Regulations 2011 with a list of Invasive Species subject to restrictions.

UNESCO: United Nations Educational, Scientific and Cultural Organization

UNESCO Biosphere: Protected area that promotes solutions reconciling the conservation of biodiversity with its sustainable use.

Vector: A vector is any material which can aid the spread of an IAS. For example seeds, soil, plant fragments, animals or invertebrates, knowingly or unknowingly spread by humans, in boats, on clothing, boots, tools etc.

White Dunes: Shifting dunes along the shoreline. Habitat code 2120.

Appendix 1: **Biosecurity Codes of Practice**

SECTION 1: FLORA – TERRESTRIAL

Fallopia japonica
Japanese knotweed

Japanese knotweed near the River Dodder (Photo: Sean Redmond).

For Staff of Dublin City Council

- If you come across it in a Council owned park or public space note or record its location and notify the Council by email at biodiversity@dublincity.ie.
- Plants should be treated in the same season that they are noticed.
- Parks head office will decide on the best course of action; whether Council staff can treat the infestation or if an outside contractor is required.
- Put up Japanese knotweed identification leaflets in all parks depots. Make sure that all staff can identify the plant by its leaf, stem, crown and particularly by its rhizome. They should also be able to identify dead canes of the plant in winter.
- Identification sheets should include Japanese knotweed, Giant knotweed and their hybrid Bohemian knotweed. All should be treated in the same way.
- Do not attempt to cut or dig or interfere with it in any way.
- Do not dig ground within 7 metres of a stand of Japanese Knotweed unless to test for presence of rhizomes. This is the potential horizontal spread of underground rhizomes.[11] Digging could stimulate rhizome growth or could cause spread of the plant to other areas from broken fragments of rhizome.
- Do not move soil from areas within 7 metres of a stand of Japanese knotweed to anywhere else.
- Plant material should never be composted.
- Be very careful using tools or machinery anywhere near this plant. If you do think tools or machinery may have come in contact with it, clean them in a safe area that will not allow spread of the plant.
- It may be advisable for each depot to have an area in which they can safely clean tools and machinery.
- Make sure top soil or bark mulch comes from a reliable source and that it has been checked for Japanese knotweed infestation.

- If it is practical fence off areas of Japanese knotweed until control work can begin.
- Control usually takes 2-5 years.[12] Thereafter the area should be monitored for re-growth. Soil in or around the infestation should still be left alone or checked to see if rhizomes are still alive, as they can remain dormant for 20 years.[13]
- Lack of re-growth is not an indication that the plant is dead and disruption of the rhizome may stimulate it.
- Unless an area of Japanese knotweed is likely to have an impact upon a development it should be controlled in its original location by herbicide treatment. Other methods such as digging and burial or removal off site should only be considered as a last resort.

For contractors working to DCC or others

- Before commencing work they should be given the same Japanese knotweed I.D. material as parks staff and contact details of a nominated person within the parks department.
- Be able to identify Japanese knotweed by its leaves, stem, crown, rhizome and dead canes.
- Record any Japanese knotweed you come across and report its location to DCC at biodiversity@dublincity.ie.
- It is illegal to dump Japanese knotweed.
- It is illegal to cause it to spread.
- Moving soil that contains Japanese knotweed requires a license from the NPWS.
- Before works take place an area should be assessed for presence of Japanese knotweed.
- Ensure that no cutting or removal takes place of this plant and that any digging work does not take place within 7 metres of the perimeter of a stand of Japanese knotweed.
- Tools and machinery should be thoroughly cleaned before being brought on site.
- Any topsoil brought onto site must be inspected first for Japanese knotweed rhizome.

For the Public

- If you come across this plant in a park or public space record its location and report it to DCC Parks at biodiversity@dublincity.ie.
- If you come across it on your own property report it as above.
- You can request an identification leaflet with information about the plant to be sent out to you.
- You can also report it to the National Biodiversity Council at www.nbdc.ie. These records allow them to map its spread across the country.
- Do not attempt to cut, dig or interfere with it in any way. This plant can spread from small fragments of stem, crown or rhizome material.
- If you do accidentally interfere with it clean any tools that may have been used.
- Be aware that it is illegal to plant, cause to spread or dump Japanese knotweed.
- If the plant is present on your property it is generally best if it is treated in situ with herbicide.
- If it is on your land it is your responsibility to ensure it does not escape into neighbouring properties.
- Beware of removal experts who promise quick results or miracle treatments. It generally takes several years of treatment to kill it and then you must keep a close eye on the area because it may re-grow. Its rhizome can remain dormant for 20 years or more.

Heracleum mantegazzianum
Giant hogweed

For Staff of Dublin City Council

- If you come across it in a Council-owned park or public space note or record its location and notify the nominated person in Parks Head Office.
- Parks head office will decide on the best course of action; whether Council staff can treat the infestation or if an outside contractor is required.
- Put up Giant Hogweed identification sheets in all parks depots.
- Do not touch, cut or dig the plant unless authorised to do so. The slightest contact of skin with stem or leaves can cause severe blistering and skin irritation if exposed to sunlight.
- If you do come in contact with it, cover your skin immediately. Wash with cold water as soon as possible.
- Be careful working on riverbanks in winter where Giant hogweed has been growing. Having dominated the banks in summer it dies back in winter, leaving the bank more susceptible to erosion.
- Be careful if using tools or machinery near this plant. Sap can spread onto them and from there onto human skin. Wash all tools or machinery in these cases.
- Be wary of spreading seeds which can attach to shoes, tools and machinery.
- Do not move soil within 4 metres of the plants as it may contain seeds.[14]
- If undertaking control work wear full protective clothing and remember that the sap in cut plants can remain active for a few hours.
- Eradication will require regular monthly checks during the growing season for late germinators.
- Any control work should be done before plants begin to flower.
- Seeds can remain viable in the ground for up to 15 years, but usually not for more than 5, so controlled areas will have to be checked annually.[15]
- Plant can be dug, cut or sprayed or a combination of these methods as recommended by head office, though spraying is believed to be most effective, especially over large areas.
- Do not cut plants more than 5cm above ground level as this encourages vigorous re-growth from the base.
- Individual plants can be killed by cutting at a 45 degree angle 15cm below ground level with a spade in April or May.
- Plants should not be strimmed.
- Whatever methods are used repeat treatments will be needed on a long term annual basis.
- It is vital to establish vegetation quickly in controlled areas to lessen the chances of subsequent germination.
- On river systems control should be undertaken on a catchment basis, working from source to mouth.
- Areas adjacent to and some distance from rivers need to be looked at.
- Because of the health risks areas accessed by staff or the public need urgent attention.
- It is recommended to work in conjunction with neighbouring landowners to tackle this plant.
- It may be advisable to put up warning notices where this plant is present in frequently used public places.
- The best time of the year to undertake control work is around April when leaves are emerging and the plant is establishing itself.[16]

For contractors working to DCC or others

- If Giant hogweed is thought to be present in their working area they should be given I.D. sheets.
- Record any Giant hogweed you come across and notify DCC Parks at biodiversity@dublincity.ie.
- Do not touch, cut or dig the plant unless authorised to do so. The slightest contact of skin with stem or leaves can cause severe blistering and skin irritation if exposed to sunlight.
- If you do come in contact with it, cover your skin immediately. Wash with cold water as soon as possible.
- Be careful working on riverbanks in winter where Giant hogweed has been growing. Having dominated the banks in summer it dies back in winter, leaving the bank more susceptible to erosion.
- Be careful if using tools or machinery near this plant. Sap can spread onto them and from there onto human skin. Wash all tools or machinery in these cases.
- Be wary of spreading seeds which can attach to shoes, tools and machinery.
- Do not move soil within 4 metres of the plants as it may contain seeds.

For the public

- If you come across this plant in a park or public space record its location and report it to DCC Parks at biodiversity@dublincity.ie.
- If you come across it on your own property report it as above.
- You can also report it to the National Biodiversity Council at www.nbdc.ie. These records allow them to map its spread across the country.
- Remember it is illegal to plant Giant hogweed or cause it to spread.
- Do not touch, cut or dig the plant unless you are fully protected. The slightest contact of skin with stem or leaves can cause severe blistering and skin irritation if exposed to sunlight.
- If you do come in contact with it, cover your skin immediately. Wash with cold water as soon as possible.
- If you have children watch that they don't go near areas where this plant is present.
- If this plant is on your property do not attempt to strim it.
- Be careful if using tools or machinery near this plant. Sap can spread onto them and from there onto human skin. Wash all tools or machinery in these cases.
- Be wary of spreading seeds which can attach to shoes, tools and machinery.
- Do not move soil within 4 metres of the plant as it may contain seeds.
- If you decide to deal with it yourself ensure you have full protective clothing including rubber gloves and boots. A face shield is also advisable.
- Sap can remain active for several hours after a plant is cut.
- Plants can be dug, cut or sprayed.
- Spraying is most effective over large areas.
- Be careful when spraying that you use an approved herbicide for your area. Some cannot be used near water.
- The best time to spray is in April/May after leaves have begun to emerge but before flower is produced.
- Seeds can remain viable in the soil for up to 5 years and possibly more so repeat annual sprayings will be necessary for several years.
- Do not cut plants more than 5cm above ground level as this encourages vigorous re-growth from the base.
- Individual plants can be killed by cutting at a 45 degree angle 15cm below ground level with a spade in April or May.
- It is vital to establish vegetation quickly in controlled areas to lessen the chances of subsequent germination.

Avoid contact. Sap from leaves, stems and roots reacts with human skin. Can produce painful rashes and blisters.

Hippophae rhamnoides
Sea buckthorn

For Staff of Dublin City Council

- This plant is highly invasive in coastal areas and threatens a number of protected habitats.
- It is illegal to plant it or cause it to spread.
- Get to know what it looks like and its growth habits. I.D. and information sheets could be put up in relevant depots.
- Report any new areas to nominated person in parks head office.
- Do not interfere with it unless it is part of a control/eradication strategy.
- Report to the National Parks and Wildlife Service if you see it for sale in a garden centre/horticultural outfit.
- Inform members of the public about the plant and the threat it poses. Encourage them not to buy or plant it and report to the National Parks and Wildlife Service if they see it for sale.
- Presently control work must take place between September and February to avoid the bird nesting season.

For the public

- This plant is highly invasive in coastal areas and threatens a number of protected habitats.
- It is illegal to plant it or cause it to spread.
- You can see this plant and learn to identify it at North Bull Island and Irishtown.
- Report any new sightings to DCC Parks at biodiversity@dublincity.ie.
- You can also report them to the National Biodiversity Council at www.nbdc.ie. These records allow them to map their spread across the country.
- Do not interfere with it if you see it anywhere.
- Do not buy this plant if you see it for sale. Report the establishment to your local Council.
- Become involved in berry picking events in the autumn on Bull Island to help stop the spread of this plant. For further information see www.dublincity.ie or email biodiversity@dublincity.ie
- Berries are edible. See recipes at:
- http://www.dublincity.ie/sites/default/files/content/RecreationandCulture/DublinCityParks/Biodiversity/Documents/Recipes%20Used%20For%20SeaBuckthorn%20Berries%20Picked%20On%20Bull%20Island.pdf

Hyacinthoides hispanica
Spanish Bluebell

Hyacinthoides non-scripta × Hyacinthoides hispanica
Spanish Bluebell hybrid

Locations of these plants in Dublin City are relatively unknown and unrecorded. It will be important to map the locations of them and also to get help from the public to record sightings. Recording is best done during the flowering stage in May/June, which gives a narrow window. Once locations are known a control programme could be initiated. The horticulture trade causes the main spread of these species through planting. This occurs through garden centres and particularly through mail order companies and the internet.[17] The hybrid variety is often sold as the native bluebell. A publicity campaign aimed at these establishments would be helpful as it would for many other invasive species; especially the aquatic ones.

For Staff of Dublin City Council

- Learn to differentiate this and the hybrid variety from our native bluebell. See http://www.plantlife.org.uk/about_us/faq/bluebells/ and http://www.nps.gov/cue/epmt/products/Hyacinthoides%20hispanica%202012%20NCREPMT.pdf
- Spanish bluebell is more vigorous than our native variety. It hybridises readily with our native bluebell and threatens the integrity of our native bluebell stock. This hybrid variety is especially increasing.
- 25-50% of the world's population of our native Bluebell is found in Britain or Ireland.[18]
- Report sightings to the nominated person in parks head office.
- These species should not be planted in our parks or open spaces. It is illegal.
- To remove Spanish bluebell it should be dug up with its leaves intact after flowering. It should then be left out in the sun to dry for one month. Bulbs should only be composted when they are dead.
- Inform members of the public about this species and encourage them not to buy or plant it.
- If you see it for sale report the establishment to parks head office.
- Report to the National Parks and Wildlife Service if you see it for sale in a garden centre/horticultural nursery.
- Aim to eliminate it and the hybrid from our parks where it is present.
- Note where it is present and be careful if any work is taking place in these areas not to move soil with bulbs in it and spread the plant.

For contractors working to DCC or others

- Ideally they should not dig or move soil in areas where these plants are present.
- In such areas I.D. sheets should be provided.
- If they are working in an area where these plants are known to be present they should be made aware not to move soil from here to elsewhere unless it is thoroughly cleaned and any bulbs removed.
- Dug bulbs should be left in the sun for one month and only composted when they are dead.
- If it is to be removed this should be done by digging bulbs after flowering and keeping the leaves intact. Bulbs should be treated as above.
- It is illegal to plant these species in our parks or open spaces.
- Any new areas of these plants should be recorded and details sent to DCC Parks at biodiversity@dublincity.ie.

For the public

- Learn to differentiate this and the hybrid variety from our native bluebell. See http://www.plantlife.org.uk/about_us/faq/bluebells/ and http://www.nps.gov/cue/epmt/products/Hyacinthoides%20hispanica%202012%20NCREPMT.pdf
- Spanish bluebell is more vigorous than our native variety. It hybridises readily with our native bluebell and threatens the integrity of our native bluebell stock. This hybrid variety is especially increasing.
- 25-50% of the world's population of our native Bluebell is found in Britain or Ireland.
- Our native bluebell is a renowned feature or our woodlands in spring. Help us to protect them.
- Report sightings to DCC Parks at biodiversity@dublincity.ie. We need your help to find out where these invasive bluebells occur in Dublin City.
- You can also report them to the National Biodiversity Council at www.nbdc.ie. These records allow them to map their spread across the country.
- If you have Spanish bluebell or the hybrid on your property ensure you don't spread the bulbs elsewhere or move soil containing bulbs.
- To remove them dig up with the leaves intact after flowering. It should then be left out in the sun to dry for one month. Bulbs should only be composted when they are dead.
- Do not buy or plant these alien bluebells. It is illegal to plant them or cause them to spread.
- If you see them for sale report the establishment/mail order seed company/internet site to the National Parks and Wildlife Service.

Impatiens glandulifera
Himalayan balsam

For Staff of Dublin City Council

- If you come across it in a Council owned park or public space note or record its location and notify DCC Parks at biodiversity@dublincity.ie.
- As well as recording you can pull this plant by hand. Grip it low down on the stem and make sure you pull it out by the roots. Break the stem separating it from the roots and leave the plant on the ground.
- Pull it if possible before it has come to flower or set seed.
- Do not disturb plants once seed pods are visible.
- Put up Himalayan Balsam identification sheets in all parks depots.
- If you decide to cut the plant, cut it in June before the flowering stage. Cutting earlier than this will encourage greater seed production from re-growing plants. Cut below the lowest node to stop regeneration.[19]
- Areas need to be checked from April to October as seeds can continue to germinate throughout the growing season and can persist for 18 months.[20]
- Chemical control can be used. Head Office will decide if this is necessary or feasible.
- Be careful working on riverbanks in winter where Balsam has been growing. Having dominated the banks in summer it dies back in winter, leaving the bank more susceptible to erosion.
- If you have been working near Himalayan Balsam in its seed stage, wash boots, tools, and machinery before moving to a new area.
- Control efforts will need to be continued for several years to eliminate the plant.

For contractors working to DCC or others

- Before commencing work, if Himalayan Balsam is known to be present in the area they should be given the same I.D. material as parks staff and contact details for biodiversity@dublincity.ie.
- Record any Himalayan Balsam you come across and report its location to DCC Parks at biodiversity@dublincity.ie
- If the plant is to be cut do so in June, before it flowers, cutting earlier will encourage greater seed production from re-growing plants. Cut below the lowest node to prevent regeneration.
- Plants can be hand pulled before they flower. Grip it low down on the stem and make sure you pull it out by the roots. Break the stem separating it from the roots and leave the plant on the ground.
- Do not disturb plants once seed pods are visible.
- Be careful working on riverbanks in winter where Balsam has been growing. Having dominated the banks in summer it dies back in winter, leaving the bank more susceptible to erosion.
- If you have been working near Himalayan Balsam in its seed stage, wash boots, tools, and machinery before moving to a new area.

For the public

- If you come across this plant in a park or public space record its location and report it to DCC Parks at biodiversity@dublincity.ie.
- If you come across it on your own property report it as above.
- You can also report it to the National Biodiversity Council at www.nbdc.ie. These records allow them to map its spread across the country.
- As well as recording you can pull this plant by hand. Grip it low down on the stem and make sure you pull it out by the roots. Break the stem separating it from the roots and leave the plant on the ground.
- Do not compost it; dispose of plants in a separate area.
- Pull it if possible before it has come to flower or set seed.
- Do not disturb plants once seed pods are visible.
- If it is on your property check the area between April and October as seeds can germinate throughout the growing season.
- Pull plants as they emerge in subsequent years. It may take several years to eliminate it.
- It is illegal to plant Himalayan Balsam or cause it to spread.
- You can become involved in volunteer efforts organised by Dublin City Council to eliminate it from our waterways.
- If you see it for sale in a garden centre inform them that it is illegal to sell this plant and/or inform National Parks and Wildlife Service.

Spartina anglica
Common Cordgrass

For Staff of Dublin City Council

- This plant is invasive on mudflats and salt marshes and threatens protected habitats.
- It can spread by seed and by rhizome material, small fragments of which can begin a new colony.
- It can be spread by water currents, humans, shipping or the feet of birds.[21]
- If working in these areas where this plant is present be careful not to dig or disturb it or its growing medium or move it to new areas.
- In the Dublin City Council area it is known to be present at North Bull Island. If you spot it elsewhere record its location and notify the nominated person in Parks.

For contractors working to DCC or others

- Any works proposed to take place on mudflats or saltmarshes may need an appropriate assessment. An important part of this should include measures to prevent spread of Common cordgrass if present.
- It is illegal to cause this plant to spread.
- I.D. sheets should be provided to workers on site.
- Do not dig up or move this plant or any mud or sand containing its rhizomes as this is its primary method of spread.
- Thoroughly clean any tools/machinery/clothing used in the vicinity of this plant. Rhizome fragments can become attached to these items and spread this way.

Spartina anglica shoots at North Bull Island National Nature Reserve (Photo: Maryann Harris).

For the public

- This plant is invasive on mudflats and salt marshes and threatens protected habitats.
- It reduces vital habitat for over-wintering wading birds.
- Report sightings to biodiversity@dublincity.ie.
- It can spread by seed and by rhizome material, small fragments of which can begin a new colony.
- It can be spread by water currents, humans, shipping or the feet of birds.
- If you come across it do not attempt to dig or disturb it. Do not move any mud or soil in which it may be present.
- Do not go bait digging on the mudflats. This in itself is illegal without a license and it may lead to spread of this plant.
- It was planted in the past to aid with coastal defence and land reclamation. It is now illegal to plant or cause it to spread.

SECTION 2: FLORA - AQUATIC

Azolla filiculoides
Water fern

Crassula helmsii
New Zealand pigmyweed

Elodea Canadensis
Canadian waterweed

Elodea nuttallii
Nuttall's waterweed

Lagarosiphon major
Curly leaved waterweed

Myriophyllum aquaticum
Parrot's feather

For Staff of Dublin City Council

- Get to know the aquatic invasive species. I.D. sheets to be sent out to all parks depots.
- These plants can take over our waterways, reduce native biodiversity, impede recreation, pose a public safety risk and impede drainage increasing the risk of flooding.
- If you come across them in a Council owned park or public space note or record its location and notify DCC Parks at biodiversity@dublincity.ie.
- Do not try to remove or interfere with any of these plants without authorisation.
- All of these species can spread and germinate from small fragments of plant material. This material can attach itself to clothing, work or recreational equipment, boats, machinery etc.
- This plant material can survive for several days and possibly weeks out of water in damp conditions.
- If clothing/equipment/machinery comes in contact with these plants undertake the correct washing/ disinfection/drying procedures. Details of these can be found on the Inland Fisheries Ireland website at www.fisheriesireland.ie/Biosecurity/biosecurity.html and www.invasivespeciesireland.com/cops
- After using boats follow Biosecurity Measures as given by either of these two organisations above.
- Be careful not to dump waste from one waterway into another.
- Inform members of the public who may be using waterways of the dangers of aquatic invasive species and what they need to do to ensure they don't spread them.

For contractors working to DCC or others

- If they are working in or near a waterway they should be informed before they start work of the presence of any of these aquatic species.
- I.D. and information sheets should be provided to them.
- Provide them with copies of Inland Fisheries Ireland and Invasive Species Ireland Codes of Practice.
- They should be aware of and be able to identify these plants and be aware that they should not plant them as part of any work projects.

For the public

- Get to know to know our aquatic invasive species. For help with identification see www.biodiversityireland.ie/projects/invasive-species/id-guides/ and www.invasivespeciesireland.com
- These plants can take over our waterways, reduce native biodiversity, impede recreation, pose a public safety risk and impede drainage increasing the risk of flooding.
- If you come across these plants in a park or public space record their location and report it to DCC Parks at biodiversity@dublincity.ie.
- If you come across them on your own property report as above.
- You can also report them to the National Biodiversity Council at www.nbdc.ie. These records allow them to map their spread across the country. If you are using water bodies for recreation where invasive aquatic species are present, whether for angling, boating, rowing, diving etc, educate yourself on how you can prevent the spread of these species. See www.fisheriesireland.ie/Biosecurity/biosecurity.html and www.invasivespeciesireland.com/cops.
- The correct washing/ disinfection/drying procedures should be undertaken for all equipment/clothing/boats used on our water bodies. See the above two websites for details.
- After this process dispose of any material in rubbish bin or skip. Do not return it to the aquatic environment.
- This plant material can survive for several days and possibly weeks out of water in damp conditions.
- Remember it is illegal to plant or cause to spread any listed aquatic invasive species.
- It is illegal to introduce any non-native species to our waterways.
- You may see these plants for sale in pet shops or horticultural establishments. They are often sold under different names. For example Curly leaved waterweed as *Elodea crispa*, Parrot's feather as Brazilian water-milfoil or oxygenator and New Zealand pygmyweed as *Crassula recurva*, *Tillaea recurva* or *Tillaea helmsii*.
- Do not buy them and look for alternative native plants for your aquarium or pond. If you have them, dispose carefully. See http://invasivespeciesireland.com/what-can-i-do/ for further information.
- Report the establishment to National Parks and Wildlife Service.

SECTION 3: FAUNA

Neovison vison
American mink

For Staff of Dublin City Council

- Has spread in recent years and threatens our native biodiversity, especially along waterways.
- Report sightings to the nominated person in parks head office. Reported sightings will be crucial to the success of any control programme.
- If you notice reductions in waterways birds report as above. This may be an indication that mink are present.
- Control programmes to be undertaken by contractors.

For contractors working to DCC or others near water courses

- Report sightings of this animal to DCC Parks at biodiversity@dublincity.ie.

For the public

- This animal is present throughout Ireland and threatens our native biodiversity, especially along waterways.
- Report sightings to DCC Parks at biodiversity@dublincity.ie.
- You can also report them to the National Biodiversity Council at www.nbdc.ie. These records allow them to map its spread across the country.
- Report reductions in waterway birds or fish stocks. This may be an indicator of mink presence.

Rutilus rutilus
Roach

For Staff of Dublin City Council

- Report sightings to the nominated person in parks head office.
- Do not release this fish into the wild or move it from one water body to another.

For contractors working to DCC or others near water courses

- Do not move this fish from one water body to another unless authorised.

For the public

- Introduced in 1889 this is now Ireland's most abundant fish in lowland waters.[22]
- This fish can out-compete and displace many of our other fish species.
- They can contribute to nutrient enrichment and lower water quality, especially in lakes.
- Report sightings to the nominated person in parks head office.
- You can also report them to the National Biodiversity Council at www.nbdc.ie. These records allow them to map its spread across the country.
- It is illegal to release this fish into the wild or to move it from one water body to another.
- If you are an angler do not use them as live bait.

Further information at:
http://invasivespeciesireland.com/wp-content/uploads/2010/07/Water_Users_CoP.pdf

http://invasivespeciesireland.com/wp-content/uploads/2010/07/Horticulture-Code-Final.pdf

Appendix 2: **Status of IAS in Dublin by Species**

THE TOP SIX: HIGH RISK

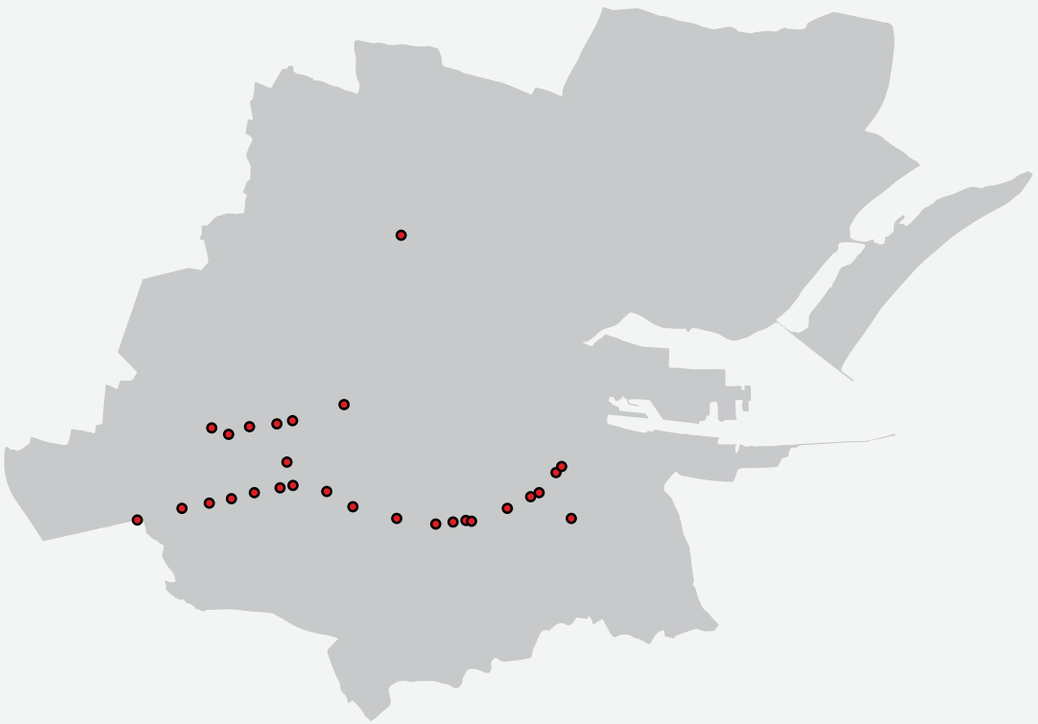
Flora

Elodea nuttallii
Nuttall's waterweed

This is a North American native, which grows in slow flowing or still water. It spreads by dispersal of fragments along and between waterways. It can dominate waterways, reducing the diversity of plants, insects and animals. It cuts off light, depletes oxygen and reduces water quality when it dies back. It can inhibit drainage increasing the risk of flooding. It reduces the recreation and amenity value of waterways. River users have a high risk of spreading this plant. It can survive for several days out of water and can be carried on boats, boating equipment, angling gear etc.

The most recent NBDC records indicate the presence of this plant on the Liffey, the Grand Canal and in ponds in the Phoenix Park. It has been causing particular problems by taking over portions of the channel of the River Liffey in recent years between Islandbridge and Chapelizod. The river here is used for swimming and boating activities such as rowing.

The plant spreads vegetatively and through broken fragments and it occupies the whole water column. It is possible that the source for the Dublin City population lies upstream and also possible that it could have been brought in on boating or angling equipment from another waterway or the dumping of aquarium contents. It generally grows in water to depths of 3 metres but can grow to depths of 6 metres in more eutrophic waters.[23]



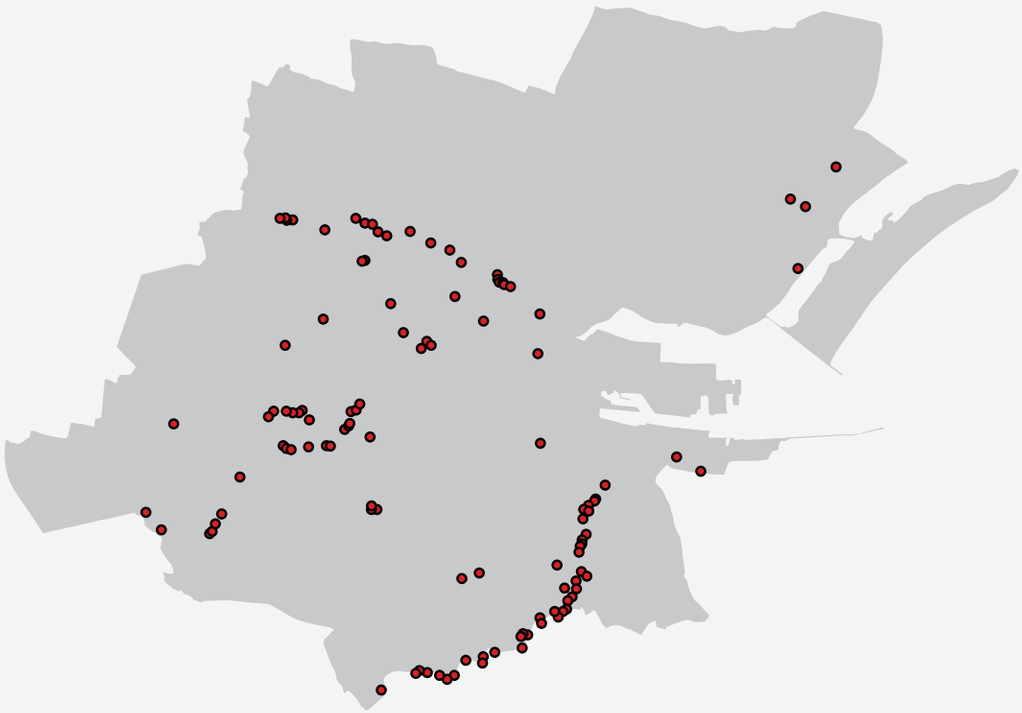
Map 1. Nuttall's waterweed in Dublin City[24]
Source: NBDC

Fallopia japonica
Japanese knotweed

A native to Eastern Asia this was introduced as an ornamental plant to Ireland in the 19th century.[25] Only female plants have been recorded in Ireland and they spread by rhizome. These rhizomes can grow to around 3 metres deep and those from one plant can spread laterally up to 7 metres. Tiny fragments of stem, crown or rhizome if broken off can regenerate into new plants. Its roots can damage infrastructure and buildings. It also completely dominates native species reducing biodiversity. It dies back in winter leaving river banks bare and susceptible to erosion. When growing along roadsides it can cause a visual obstruction and a danger to motorists. Sedimentation in rivers can increase, with potential impacts on fish spawning.

It is of major economic concern because it is capable of getting through cracks in foundations and walls causing damage to properties and its presence has serious implications for home owners and prospective buyers and sellers. It can also grow under and through tarmac, concrete and road surfaces, especially where gaps or cracks occur, and is a major hazard to the built environment.

This plant is very prevalent along waterways in Dublin City but is also more widespread away from water than either Giant Hogweed or Himalayan Balsam. NBDC records show it to be present along the Dodder, Liffey, Tolka, Cammock and Santry rivers as well as the Grand and Royal Canals.



Map 2. Japanese knotweed in Dublin City
Source: NBDC

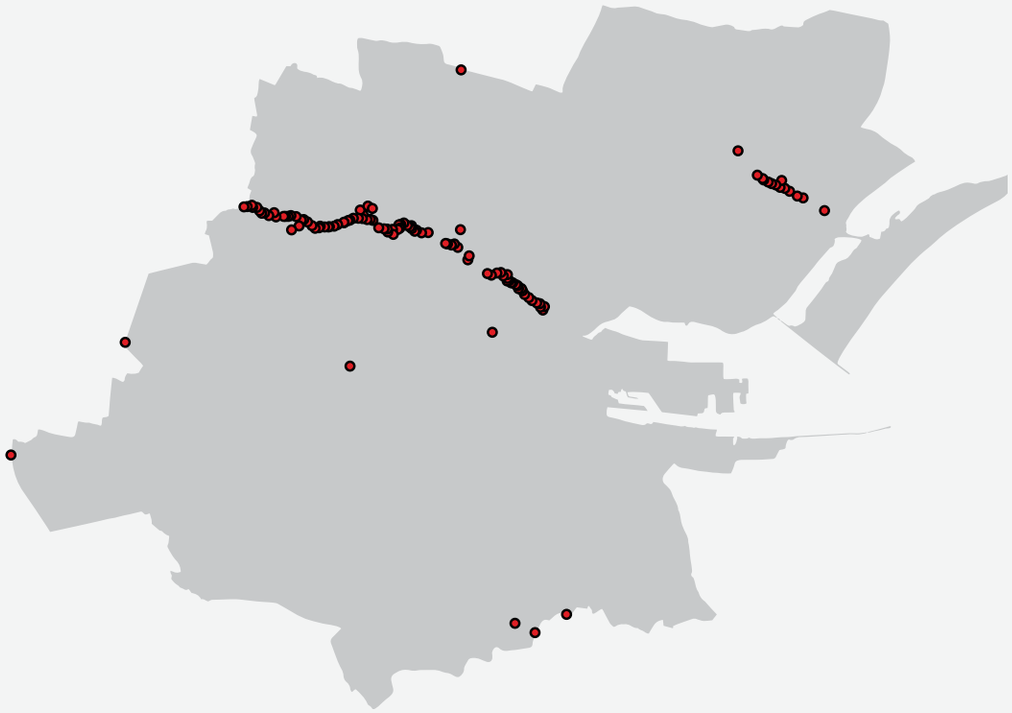
Heracleum mantegazzianum
Giant hogweed

This is an invasive plant from central Asia brought into Ireland in the 19th century.[26] The main issue with Giant Hogweed is one of public health. Even slight contact of human skin with the stems or leaves can result in serious rashes, blistering and skin inflammation, if skin is exposed to sunlight. These symptoms may re-occur in sunlight. It also out-competes native species and dies back in winter, leaving banks vulnerable to erosion and the rivers to sedimentation. It was recorded as "naturalised" in Blackrock Park (just outside the current city limits) in 1902.[27]

NBDC records show it present in and close to the rivers Tolka and Santry especially, although it can be found growing some distance from rivers. It is very prevalent near the Tolka occurring from Blanchardstown to Drumcondra. It spreads by seed especially along waterways.

Each plant produces an average of 10,000 – 20,000 seeds.[28] It is thought possible that these seeds can remain viable for 15 years before germination, but generally not beyond 5 years. Growing plants can postpone flowering for many years and overwinter as a tap root. It is present along the Santry River. The most recent records for the city come from the NBDC for 2009 but this needs to be looked at and mapped. There are records from the Royal Canal and River Dodder from 2012.

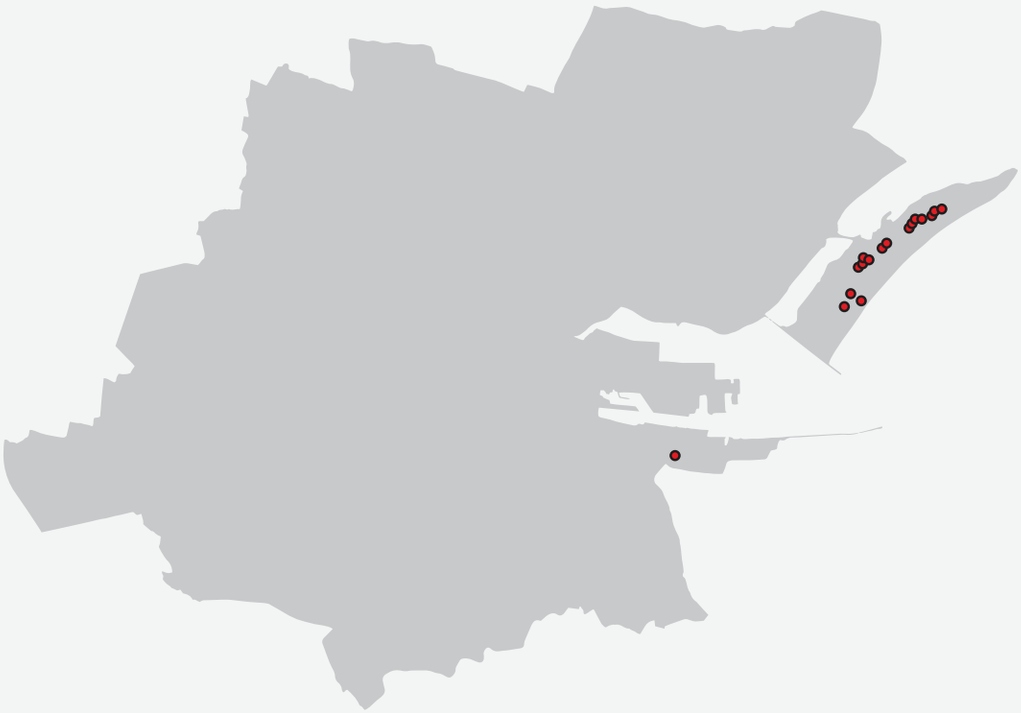
It is clear from its distribution that it is present primarily in the vicinity of waterways and that they act as a pathway for its spread. It can however spread a good distance from the water, for example it is widespread along the Finglas Road in the vicinity of Bellevue Industrial Park. It has also colonised waste ground in other scattered locations in the city.



Map 3. Giant hogweed in Dublin City
Source: NBDC

Hippophae rhamnoides
Sea buckthorn

Sea buckthorn has been planted to stabilise soil and for its berries which are popular as a food source and for medicinal purposes. It threatens to alter the protected dune ecosystem on North Bull Island National Nature Reserve.[29] It grows and spreads vigorously dominating the native dune species, which include a number of orchids. It sucks moisture from the ground changing the habitat structure and nutrient composition of the site. It threatens the Alder Marsh, a habitat for the Marsh Fritillary, the only Irish butterfly protected under the Habitats Directive. It is known to be present at North Bull Island and Irishtown. This plant spreads by way of its berries, which may be carried by birds, animals and humans, and by its rhizome system. It is also sometimes sold in garden centres and by horticulture traders. It has been planted by people and organisations to stabilise soil, act as a wind break and for its berries, which can be harvested for human consumption.

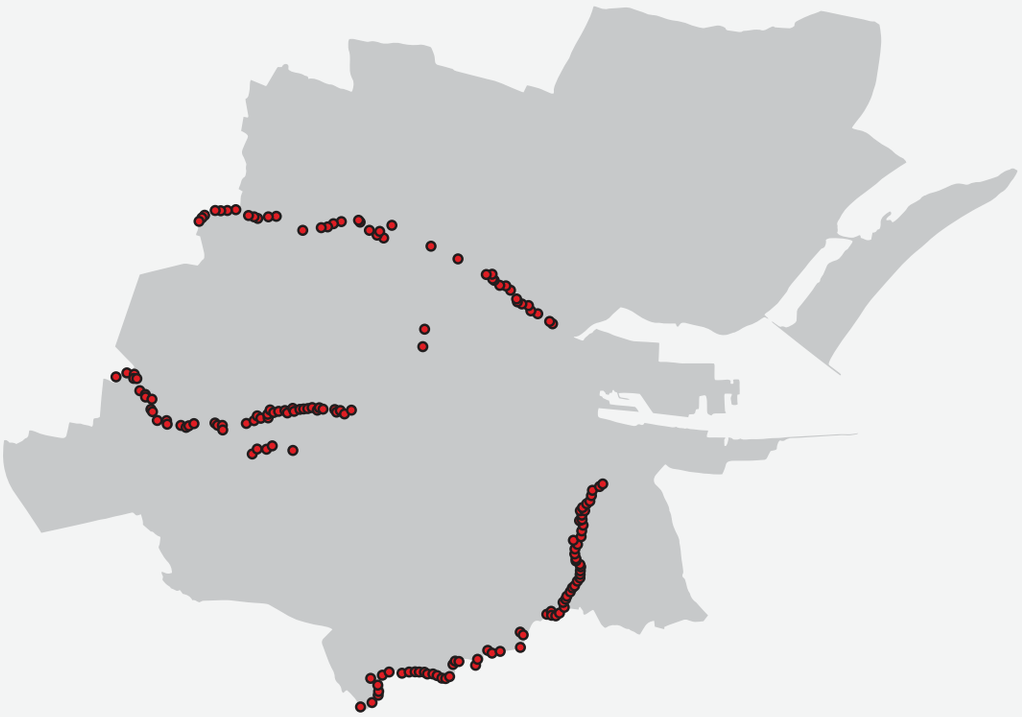


Map 4. Sea buckthorn in Dublin City
Source: NBDC

Impatiens glandulifera
Himalayan balsam

This was introduced to Ireland in 1839.[30] It originates in Western Asia. It grows bigger and more vigorously and forms far denser stands in its introduced environment than in its native range. It dominates native species leading to a loss in biodiversity. In winter it dies back leaving river banks susceptible to erosion and rivers at risk from sedimentation. It is very attractive to bees, which can reduce the pollination and seed set of native species. Himalayan Balsam spreads by seed. Each plant produces several thousand which can be shot out up to 6 metres from the plant[31] and also then spread further by water, wind, birds and animals. It spreads particularly effectively along waterways as seeds are carried downstream. Seeds can remain viable in the ground for up to 18 months.

This plant is very pervasive along our 3 major rivers; the Dodder, Liffey and Tolka. While most NBDC records along these rivers are within the Dublin City area it is known to be present further upstream in other local authority areas along all 3 rivers. Latest records show it present along the Cammock River in the vicinity of Kilmainham. It has been recorded at numerous other locations in the city in recent years some of them a good distance away from waterways.



Map 5. Himalayan balsam in Dublin City
Source: NBDC

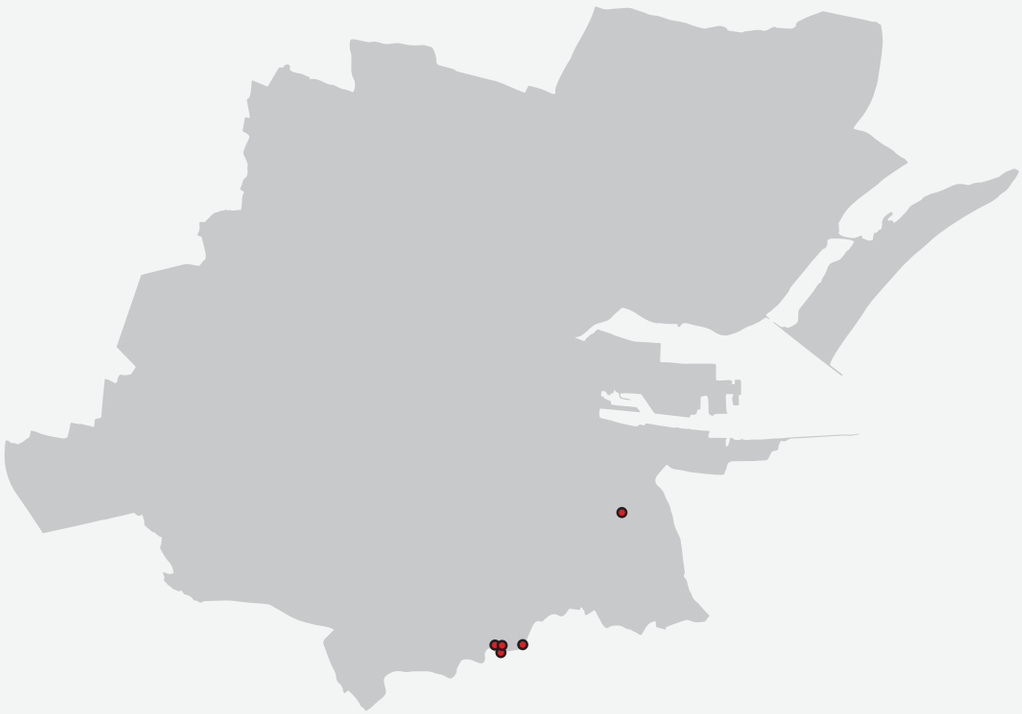
Fauna

Neovison vison
American mink

The mink is counted among the world's worst 100 invasive species by the International Union for the Conservation of Nature (IUCN). It thrives in most habitat types in Ireland with access to fresh water. It is a voracious predator of fish, birds and mammals. Of real concern is their predation of waterways birds and fish species including the Annex I listed Kingfisher and the Annex II Atlantic Salmon.

It has been present in Ireland since mink farming began in the 1950s and was first recorded in the wild in 1961.[32] It is difficult to see and record, being nocturnal, elusive and mobile and therefore it is not easy to gain an accurate picture of its numbers or distribution. Recorded sightings sent to the NBDC mostly date from 2010 but this may simply be due to its elusive nature or the lack of a well known recording facility.

Fur farms provided the source for the mink population in Ireland. In the last two years, mink have been seen by Council staff, IFI staff and members of the public along the Dodder, Liffey and Tolka river systems. A reduction in the numbers of waterfowl has been observed along the River Dodder, a good indication of mink presence.



Map 6. American mink in Dublin City
Source: NBDC

Medium Risk

M Flora

Crassula helmsii
New Zealand pygmyweed

There are NBDC records from the Botanic Gardens in Glasnevin going back over 20 years. The most recent records come from Clondalkin in 2007, the Grand Canal at Dolphins Barn in 2009 and the Liffey at Chapelizod in 2009. There have been no systematic surveys for this species in Ireland but it has the potential to spread rapidly.[33] Dispersal of this plant occurs almost entirely by vegetative fragments. A single node on 10mm of stem can re-germinate[34] to start a new plant. It can spread on angling or boating equipment. It is commonly sold in garden centres. It can grow in various fresh water bodies but also in damp ground on their margins where it dominates and reduces native biodiversity.

Gunnera tinctoria
Giant rhubarb

There are two NBCD records for this plant; one at Chapelizod near the River Liffey from 2009 and another from the Phoenix Park in 2014. One plant was observed by DCC staff along the Dodder south bank upstream from Clonskeagh Road in 2015. This plant can reproduce both by seed and by vegetative means. It produces long low growing rhizomes, small fragments of which have the potential to produce new plants. A mature plant can produce up to 250,000 seeds.[35] It is invasive in the west of Ireland but as yet it has not caused major problems in Dublin City possibly due to different environmental conditions or the fact that it is only in the early stages of the invasive process.

It is often sold in garden centres and could have been planted deliberately or spread from garden plants. Other vectors for its spread could be waterways, birds or anthropogenic activities.

Lagarosiphon major
Curly leaved waterweed

This plant is a native of southern Africa. It grows rapidly and spreads via plant fragments. It can completely take over water bodies, destroying native biodiversity and impeding economic activities and recreation. This plant is commonly sold as an oxygenating plant to be used in garden ponds and fish tanks. It can also spread on boating or angling equipment or clothing. All reproduction of this plant in Ireland is by vegetative means or fragmentation of stems. Only one listed NBDC record for Dublin City occurs from 1999 at Islandbridge on the Liffey. This was present and had taken over a pond at Darndale used by local anglers. It was subsequently removed... Latest reports (July 2015)[36] indicate that its removal has been successful.

Myriophyllum aquaticum
Parrot's feather

The most recent NBDC records are from 2008 and 2009. One is from Donnybrook castle and the other two from the Grand Canal at Drimnagh. These locations should be checked to see if it is still there. This plant grows in water bodies but also on dry land. Like most other aquatic invasive plants it can spread through the dispersal of small fragments. Pathways include gardening, the horticulture trade, boats, angling equipment, clothing, animals and water currents.

Rhododendron ponticum
Rhododendron

There is one NBDC record from the Kilmainham area. Rhododendron spreads by seed (up to 7000 seeds can be produced on each branch)[37] and it can spread vegetatively. It dominates native vegetation forming extensive impenetrable thickets, which are very poor from a biodiversity viewpoint. This is extremely invasive in parts of the west and south of Ireland.

Spartina anglica
Common cordgrass

Present in the mudflats and saltmarshes of North and South Bull Island. It is also present at Rogerstown and the Broadmeadow estuary and at Baldoyle estuary in nearby Fingal. It was originally planted deliberately to reclaim coastal mudflats. It has since spread rapidly through its root systems and through transport of broken fragments of roots and by seed. It out-competes native mudflat and saltmarsh plants and has the potential to alter the composition of protected habitats. The plant can be dispersed through water currents, humans, ships and the feet of waterfowl.

McCorry, 2009,[38] noted that small clumps of Cordgrass began spreading in 1965 after the construction of the causeway. McCorry, 2009,[39] mentions that it is very difficult to ascertain Cordgrass spread without accurate and detailed baseline data.

M Fauna

Sciurus carolinensis
Grey Squirrel

This animal was brought into County Longford in 1911 as a present for a local landowner. A few animals were released and it has since colonised a large proportion of the country. It is present throughout the city especially in parks but also in suburban gardens and other locations. It is difficult to assess precise numbers without intensive surveys. Pathways for spread could be through parks, along green corridors and river banks, through gardens and anywhere with a reasonable amount of trees and vegetation. It may be more limited in its spread in intensely built up areas.

The Red squirrel is present on DCC land at Bohernabreena Reservoir and at Howth Head and Killiney Hill on the margins of the city.

Low Risk

Flora

Azolla filiculoides
Water fern

This plant has not been recorded in recent years in Dublin City. A weevil *(Stenopelmus rufinasus)* has been used as a control agent in other countries and has been found in Ireland since 2007.[40] This appears to offer a safe and very effective biological control of this plant. The Water fern does not appear to constitute a serious threat.

Elodea Canadensis
Canadian waterweed

Since 2009 the NBDC has records for this plant from the Grand Canal and the Phoenix Park and one from the Santry River. It is not believed to be as serious a threat as some of the other aquatic invasive species. It is similar in its means of growth and spread to Nuttall's waterweed though the latter species tends to dominate it and take over from it.

Unknown Level of Risk

Flora

Hyacinthoides hispanica
Spanish Bluebell

Hyacinthoides non-scripta × Hyacinthoides hispanica
Spanish Bluebell hybrid

No NBDC records exist in Dublin City for Spanish bluebell or the hybrid but it is believed to be present. It is easy to confuse them with the native bluebell. The Spanish bluebell and the hybrid are more vigorous than the native variety. In the UK and possibly in Ireland it threatens the native bluebell.

Fauna

Rutilus rutilus
Roach

There is one record from the People's Garden in the Phoenix Park from 2012 from the NBDC but it is likely to be present in other places such as the canals, and the River Liffey. Most of the spread of Roach in Ireland has been due to deliberate introduction for angling.

Appendix 3: **Strategies by Species**

The Top Six: High Risk

H Flora

Elodea nuttallii
Nuttall's Waterweed

Aims

- Control the extent and spread of this species on the Liffey between Islandbridge and Chapelizod.
- Prevent this and other aquatic IAS from entering into DCC waters from elsewhere and from leaving DCC waters for elsewhere.

Ongoing and Future Actions

- Control work on this plant in the River Liffey between Islandbridge and Chapelizod will begin in the spring of 2016. This will involve a combination of cutting and use of jute matting.
- Monitoring to take place alongside and after control work.
- Publicise Biosecurity Codes of Practice to river users and the general public.

Nuttall's waterweed in the River Liffey (Photo: Maryann Harris).

Nuttall's waterweed from the River Liffey (Photo: Maryann Harris).

Fallopia japonica
Japanese Knotweed

Control measures need to take account of its extremely deep and extensive rhizomes and its capacity to germinate from tiny fragments of broken root, crown or stem. The legal and economic implications of the spread of this plant make it a priority to be tackled.

Aims

- Control the spread of this plant in the DCC area and remove it from sensitive areas.

Actions

- This plant has been controlled in sections along the Dodder.

Ongoing and Future Actions

- Map it throughout the DCC area and to its furthest growth point upstream along rivers. Co-operation with other Councils will be necessary.
- Develop a control strategy to include how, where and when works should take place.
- DCC staff may be able to perform some work but most work will probably be undertaken by outside contractors. A Japanese knotweed protocol for Ireland is currently being developed.
- Long-term control work, (2-5 years for each area and more if necessary), will be needed. Monitoring should take place alongside this and for many years afterwards to check for re-growth.
- Produce a Code of Practice guide for DCC staff, contractors and the public.
- Ensure Biosecurity measures are applied to any work where it is known to be present.
- Generate awareness and publicity as was done during 2015 at events, walks, talks, displays

Japanese knotweed on bank of the River Dodder in autumn (Photo: Sean Redmond).

Heracleum mantegazzianum
Giant Hogweed

Aims

- Control its spread and reduce its extent, or eliminate if possible, along river catchments to protect native biodiversity and public health.

Actions

- DCC has been monitoring and controlling this species along the Tolka Valley since 2007. Reduction in area has been evident.

Ongoing and Future Actions

- Record and map its extent within the DCC area and further upstream to its source populations. This should be done in 2016 before any control work. Make sure to locate areas away from rivers where it might occur and which could act as a reservoir of seeds for continuing invasion.
- Control work can be co-ordinated between the different Councils within the river catchments, starting at the source population. Herbicide application is recommended early in the season (April) so control measures may have to be held off until 2017. Biosecurity measures for this species should be adhered to.
- Mapping and control measures to work from source to mouth. It is vital that the source population for each catchment is found and eliminated.
- Produce a guide for DCC staff, private contractors and the public on how to deal with this plant.
- Work in co-operation with other Councils where necessary.
- Generate awareness and publicity as was done during 2015 at events, walks, talks, displays.
- It is possible to eradicate this plant if control and monitoring are continued for several years and the seed bank is destroyed.

Giant hogweed mature plant with its bold leaves towers above native plants at Tolka Valley Park (Photo: Maryann Harris).

Giant hogweed – a young plant in April (Photo: Spantax).

Hippophae rhamnoides
Sea Buckthorn

Aims

- Preserve the unique status and habitats of North Bull Island by controlling the spread of this plant.

Prevent Sea Buckthorn spreading into or affecting the Alder Marsh, which provides habitat for the Marsh Fritillary, the only protected butterfly species in Ireland.

Sea buckthorn at Irishtown Nature Park (Photo: Maryann Harris).

Sea buckthorn on North Bull Island (Photo: Niamh Ni Cholmain).

Actions

- Control efforts have been underway for several years.
- Bushes are cut between September and February to avoid the bird nesting season. Much of this work is undertaken by volunteer groups organised by DCC.
- Council staff inject cut stumps to kill them.
- Cut bushes are left on the area to help prevent suckers growing and seeds germinating.
- Autumn events are organised by DCC to pick berries, thereby reducing the amount of seed germination. These events are also useful for spreading information about this species.
- Coverage on the island was mapped during the summer of 2015.

Ongoing and Future Actions

- Produce a GIS map of its distribution at North Bull Island.
- Intensify current control measures.
- Develop a strategy to deal with seedlings and suckers that grown from rhizomes. This will require an intensive digging effort.
- Continue autumn berry picking events.
- Set aside an area to monitor the effectiveness of different control measures. It may be that a new approach will be needed to at least augment current control measures.
- Liaise with Fingal County Council to assess the effectiveness of their control measures.
- Advice may also be obtained from the many UK sites, which have instigated control measures.
- Raise public awareness at events, displays and talks.
- Act upon any new sightings quickly before the plant takes hold.

Impatiens gladulifera
Himalayan Balsam

Himalayan Balsam is one of the IAS most amenable to control measures within defined areas. It is an annual plant, spreads by seed and is shallow rooted so volunteers can be trained to remove it. It has been removed from vast stretches of other river catchments in Ireland, namely the Blackwater, by these methods.[41] Control efforts are focused on the Dodder system where it is most prevalent and accessible.

Aims

- Remove this plant from our river systems beginning with the Dodder.

Actions

- This plant has been tackled by volunteer groups organised by DCC in previous years with some success.
- Spraying work has also taken place in some areas.

Ongoing and Future Actions

- Map its extent along river systems focusing especially on the Dodder, Liffey and Tolka in 2016. Proceed as far upstream as is necessary until the source of the infestation is found. This will necessitate co-ordination with other Councils. Areas in the vicinity of rivers but away from the banks will need to be checked. Access points to the river should be marked.
- Develop a control methodology, which can be begun in 2016. 2015 provided valuable experience as to what and how control methods can be applied and who can perform them.
- Decide in which areas volunteers can be used and in which areas either DCC staff or private contractors should undertake work.
- A combination of hand pulling and spraying will likely be most effective in removing the plant.
- Produce a health and safety statement for volunteers working near water.
- Continue to involve community groups within health and safety parameters.
- Continue monitoring during and after removal work.
- Target eradication of this plant from individual catchments.
- Generate further awareness and publicity at events, walks, talks and displays.

Himalayan Balsam in flower along the River Tolka (Photo: Maryann Harris).

Launching National Fisheries Week at Bushy Park with a Balsam Bash to remove Himalayan balsam (Photo: Inland Fisheries Ireland).

Fauna

Neovison vison
American Mink

This is currently a priority invasive mammal to be tackled in Dublin City. The Dodder has a number of protected species living along it, such as the Annex I Kingfisher and the Annex II Atlantic salmon. These species along with many others are threatened by mink predation. The Dodder has heavy public usage and is used by community and recreation groups all of whom will benefit from a reduction of this invasive predator

American mink (Photo: Brendan Lally).

Aims

- Reduce mink populations along our river catchments to help birds and fish to breed in compliance with EU Directives and to comply with our obligations under EU Regulations.
- Protect native biodiversity.
- Protect the character and amenity value of our river catchments.

Actions carried out

- Control measures have been in progress in 2014-15 in agreement with the NPWS.
- DCC organised monitoring meetings in 2014-2015, with representatives from DCC, SDCC, DLRCC, IFI, and NPWS.

Ongoing and Future Actions

- Aim to control impacts of mink in areas of highest biodiversity of the riparian zone, including areas for ground-nesting birds within Parks and for salmon. These zones will be identified from data collected by Birdwatch Ireland in the DCC Urban Birds Project and Inland Fisheries Ireland.
- Ensure all controls are following best practice and in accordance with National Parks and Wildlife Service requirements and advice.
- Hold meetings of the relevant management authorities at least twice a year to assess progress, exchange information and plan future actions. These meetings are a good template for how local authorities can co-operate to deal with IAS.
- Continue annual bird surveys by Birdwatch Ireland which will give a baseline figure for bird numbers, an indication of the success in protection of biodiversity and an indication of where to target.
- Devise and implement strategies for other rivers in the DCC area beginning in autumn 2015.
- Get student involvement to assess mink numbers, habitat usage and diet along the Dodder.
- Some remediation work to improve habitat for birds and fish may be necessary.
- Continue monitoring for mink presence.

Medium Risk

M Flora

Crassula helmsii
New Zealand pigmyweed

Aims

- Eliminate it from the DCC area and prevent it re-colonising.

Ongoing and Future Actions

- Check recorded locations to see if it is still present and map it
- Careful physical removal or dredging out of material may be possible. Cutting is not recommended.[42] Smothering with sheeting such as black polythene for up to ten weeks during the growing season is an option.
- Chemical control of emergent material is another option.
- Monitor these areas after work.
- Publicise Biosecurity measures to river users and the general public.

New Zealand pigmyweed can choke wetlands and waterways (Photo: Benjamin Blondel).

Gunnera tinctoria
Giant rhubarb

Aims

- Eliminate it from Dublin City.

Actions

- Map its locations.
- Eradicate. Mechanical control may be viable because of limited number of locations.
- Thereafter monitor areas for re-growth.

The huge leaves of giant rhubarb along a path by the River Tolka (Photo: Maryann Harris).

Lagarosiphon major
Curly leaved waterweed

Aims

- Prevented it from becoming a problem in Dublin City by acting quickly when any records of its presence become known.

Actions

- It was eradicated from an angling pond in Darndale, which it began to infest in 2009, by the use of jute matting.

Ongoing and Future Actions

- Establish if it is currently present in Dublin City.
- Eradicate if possible using known successful methods applied elsewhere.
- Monitor effectiveness thereafter.
- Publicise Biosecurity measures to river users and the general public

Dense clumps of curly leaved waterweed removed from the ponds of Darndale Park (Photo: Maryann Harris).

Myriophyllum aquaticum
Parrot's feather

Aims

- Remove this plant from the DCC area.
- Prevent re-colonisation.

Ongoing and Future Actions

- Check the last known locations. Map and instigate control work. Thereafter continue monitoring.
- Publicise Biosecurity Codes of Practice to river users and the general public.

Parrot's feather (Photo: A. Karwath aka).

Rhododendron ponticum
Rhododendron

Aims

- Eliminate this plant from the Dublin City area.

Ongoing and Future Actions

- Investigate the one known record from Dublin City and eradicate it.
- Raise public awareness at events, displays and talks.

Rhododendron in bloom (Photograph: A. Barra).

Spartina anglica
Common Cordgrass

Aims

- Measure the extent of Common cordgrass cover at North Bull Island.
- Measure its coverage in the 3 protected Annex I saltmarsh habitats of Salicornia Flats, Atlantic Salt Meadows and Mediterranean Salt Meadows.

Actions

- Control work took place at North Bull Island from 1970-1995 after which it was felt that monitoring was the best option.

Ongoing and Future Actions

- Record Common cordgrass cover and produce a GIS map of its distribution at Bull Island. Establish this as a baseline figure against which to monitor future change.
- Adopt Biosecurity measures for any works taking place on the mudflats and salt marshes at North Bull Island.

Common cordgrass at North Bull Island saltmarsh is evident as the bright green plants in the middle of native vegetation (Photo: Maryann Harris).

M Fauna

Sciurus carolinensis
Grey Squirrel

Control efforts have taken place in some city parks, with a certain degree of success. Control efforts in defined areas, for example to protect or allow re-colonisation of the Red squirrel, may be feasible of they are continued on a long term basis.

Grey squirrel at St. Anne's Park (Photo: Anthony Woods).

Low Risk

L Flora

Azolla filiculoides
Water fern

This does not currently constitute a serious invasive threat at present in Dublin City but will be monitored.

Water fern turns pink and can completely cover a pond (Photo: Daniel J. Layton).

Elodea Canadensis
Canadian waterweed

There are no plans to manage this plant in Dublin City but if the need did arise, control measures would be similar to those for Nuttall's waterweed.

Canadian waterweed can spread by pieces that break off (Photo: Christian Fischer).

Unknown

Flora

Hyacinthoides hispanica
Spanish Bluebell

Hyacinthoides non-scripta×Hyacinthoides hispanica
Spanish Bluebell hybrid

As shown above, the two flowers are noticeably different, but they can combine and hybridise outdoors to make it quite confusing to identify!

Aims

- Until their abundance and extent in Dublin City is known it is difficult to estimate whether eradication or control are more feasible.

Ongoing and Future Actions

- Map their extent in the Dublin city area.
- Make park staff aware of their possible presence.
- Begin removing where found to be present.
- Raise awareness through events and displays and through the newspaper and website, which may help to produce records.
- Educate the public about the difference between these varieties and the native bluebell will be important.
- Ensure that native Irish bluebells *(Hyacinthoides non-scripta)* are planted and discourage people from selecting the non-native species.

The native Irish bluebell (Hyacinthoides non-scripta) has a drooping stem with flowers arranged in a row drooping down the stem, as in this example from County Down (Photo: Ardfern).

Spanish bluebell (Hyacinthoides hispanica) growing at the Barcelona Botanic Gardens has larger flowers stiffly arranged in a whirl around the upright stems. (Photo: Consultaplantas).

Fauna

Rutilus rutilus
Roach

Anglers need to be made aware of their responsibilities. Publicising biosecurity measures is considered the best way to achieve this.

Roach (Photo: Peter van der Sluijs).

Endnotes

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Notes

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